

Patent Claims:

1       1. Flow-mechanically effective surface of a device moving in  
2       a fluid, especially a flying machine, especially a lifting  
3       surface of a flying machine, whereby the surface (1)  
4       comprises an elastic axis (EA) extending in the span  
5       direction (6) of the surface (1) and an adjustable control  
6       surface (3), characterized in that the surface (1) is  
7       elastically deformable in a bending direction and/or in a  
8       direction about the elastic axis (EA) dependent on the  
9       adjustment of the control surface (3) while changing the  
10      induced flow-mechanical resistance, and that a control  
11      and/or regulating arrangement (10, 11, 12; 13, 14, 15) for  
12      the adjustment of the control surface (3) in the sense of  
13      a minimization of the induced flow-mechanical resistance of  
14      the surface (1) is provided.

1       2. Flow-mechanically effective surface according to claim 1,  
2       characterized in that the control surface (3a; 3b; 3c; 3d;  
3       3e; 3f) is arranged offset by a prescribed spacing distance  
4       relative to the elastic axis (EA).

1       3. Flow-mechanically effective surface according to claim 1 or  
2       2, characterized in that the control surface (3a; 3b; 3c;  
3       3d; 3e; 3f) is arranged rotatably supported about a  
4       rotation axis (4), and that the rotation axis (4) or at  
5       least a component thereof extends in the direction of the  
6       elastic axis (EA).

1       4. Flow-mechanically effective surface according to claim 2 or  
2           3, characterized in that the control surface (3) is  
3           arranged by a prescribed spacing distance behind the  
4           elastic axis (EA).

1 5. Flow-mechanically effective surface according to claim 2 or  
2 3, characterized in that the control surface (3a; 3b; 3c;  
3 3d; 3e) is arranged by a prescribed spacing distance in  
4 front of the elastic axis (EA).

1       6. Flow-mechanically effective surface according to one of the  
2            claims 1 to 5, characterized in that the control surface  
3            (3b; 3d) is arranged within the wing span.

1       7. Flow-mechanically effective surface according to one of the  
2            claims 1 to 5, characterized in that the control surface  
3            (3a; 3c; 3e; 3f) is arranged outside of the wing span.

1       8. Flow-mechanically effective surface according to claim 6 or  
2           7, characterized in that the control surface (3a; 3b) is  
3           arranged behind the leading edge of the surface (1).

1 9. Flow-mechanically effective surface according to claim 6 or  
2 7, characterized in that the control surface (3c; 3d) is  
3 arranged in front of the leading edge of the surface (1).

1       10. Flow-mechanically effective surface according to one of the  
2       claims 1 to 9, characterized in that the control surface  
3       (3c; 3e) is provided in addition to a wing tip surface  
4       (winglet) (2) at the surface tip.

1       11. Flow-mechanically effective surface according to one of the  
2       claims 1 to 9, characterized in that the control surface  
3       (3f) itself is embodied as a wing tip surface.

1       12. Flow-mechanically effective surface according to claim 11,  
2       characterized in that the rotation axis (4) of the control  
3       surface (3f) forming the wing tip surface (2) extends  
4       obliquely relative to the direction of the elastic  
5       axis (EA).

1       13. Flow-mechanically effective surface according to one of the  
2       claims 10 to 12, characterized that the surface (1) is a  
3       lifting wing of a flying machine, whereby the wing tip  
4       surface (2) continues the lifting wing at its tip obliquely  
5       or vertically upwardly.

1       14. Flow-mechanically effective surface according to claim 10,  
2       characterized in that the surface (1) is a lifting wing of  
3       a flying machine, whereby the wing tip surface (2)  
4       continues the lifting wing obliquely or vertically upwardly  
5       and the control surface (3a; 3b; 3c; 3e) continues the  
6       lifting wing in its direction or obliquely downwardly.

1       15. Flow-mechanically effective surface according to one of the  
2       claims 1 to 14, characterized in that the surface (1) is  
3       the lifting surface of an aircraft.

1       16. Flow-mechanically effective surface according to one of the  
2       claims 1 to 14, characterized in that the surface (1) is  
3       the lifting surface of a rotary wing aircraft.

1       17. Flow-mechanically effective surface according to one of the  
2       claims 1 to 16, characterized in that there is provided a  
3       control arrangement (10, 11, 12) for the generation of an  
4       actuating signal for the control surface (3) from data  
5       relating to the aircraft loading and the flight condition,  
6       with utilization of stored nominal value data.

1       18. Flow-mechanically effective surface according to one of the  
2       claims 1 to 16, characterized in that there is provided a  
3       regulating arrangement (13, 14, 15) for the generation of  
4       an actuating signal for the control surface (3) from  
5       comparison of measured data representing the actual elastic  
6       deformation of the flow-mechanically effective surface (1)  
7       with nominal data representing a nominal deformation of the  
8       flow-mechanically effective surface (1) prescribed for the  
9       aircraft loading and the flight condition.